What is claimed is:

1.   A parallel lookup engine for fast packet forwarding in a network router comprising:

multiple lookup engines for performing packet forwarding lookup in parallel in the network router; and

a selector for selecting and outputting the longest one of the lookup results performed by the multiple lookup engines,

wherein each lookup engine comprising:

a memory for saving forwarding information appropriately distributed to each lookup engine so that entries stored in the forwarding table may not be redundant;

an inspection device for receiving input data extracted from the packet header and identifying if the forwarding information associated with the input data is stored in the memory; and

a controller for retrieving the forwarding information necessary to find out the output interface of the packet in case the forwarding information associated with the input data proves to be stored as a result of the identification of the inspection device.

2.   The parallel lookup engine of claim 1, wherein the memory stores the forwarding information in a prefix tree data structure.

3.   The parallel lookup engine of claim 2, wherein the memory has a prefix tree structure that is different from that of the memory

included in other lookup engine.

4.   The parallel lookup engine of claim 1, wherein the inspection device masks k continuous bits out of the inputted data and identifies if the masked data is the same as the bit type stored in the inspection device, and if the identification result is yes, judges that the forwarding information associated with the input data is stored in the memory.

5.   The parallel lookup engine of claim 4, wherein the bit stored in the inspection device varies depending on the forwarding information stored in the memory.

6.   The parallel lookup engine of claim 1 or 2, wherein the controller selects and outputs the longest value out of multiple values the same as the prefix having a specific length and the input data in retrieving the forwarding information.

7.   The parallel lookup engine of claim 1, wherein the input data includes at least one of the destination information and the source information extracted from the packet header.

8.   A high-speed packet forwarding method in a network router includes;

(a) step of extracting header information from an inputted packet;

(b) step of verifying the accuracy of the header;

(c) step of extracting the destination information from the header;

(d) step of performing lookup in parallel intended to extract forwarding information associated with the destination information, using a prefix tree;

(e) step of extracting output interface information in response to the lookup result; and

(f) step of changing the packet header in response to the output interface and forwarding the packet to the exterior.

9.   The method of claim 8, wherein step (d) comprises:

(d-1) step of providing information about a desired key to multiple lookup engines;

(d-2) step of identifying whether the provided key exists in each lookup engine;

(d-3) step of retrieving a prefix tree and returning the information about the desired key in case the desired key exists in each lookup engine after the result of step (d-2); and

(d-4) step of selecting and outputting the longest value of the multiple data returned in step (d-3).

10.   A parallel lookup method for a fast packet forwarding in a network router comprising:

(a) step of providing information about a desired key to multiple lookup engines;

(b) step of identifying whether the provided key exists in each lookup engine;

(c) step of retrieving a prefix tree and returning the information about the desired key in case the desired key exists in each lookup engine after the result of step (b); and

(d) step of selecting and outputting the longest value of the multiple data returned in step (c).

11.   The method of claim 10, wherein step (b) comprises:

(b-1) step of masking k continuous bits out of the provided key;

(b-2) step of identifying if the masked bit in step (b-1) is the same as the bit type stored in the lookup engine; and

(b-3) step of judging that the provided key exists in the lookup engine in case the masked bit is the same as the bit type in step (b-2).

12.   The method of claim 11, wherein the bit compared with the masked bit in step (b-2) varies depending on the forwarding information stored in the lookup engine.

13.   A computer-readable recording medium for recording a program intended to execute one method of claims 10 through 13 in a computer.